A comparative ecological analysis of seasonal variation of zooplankton diversity and its impact on hydrobiology of selected waterbody of Darbhanga in relation to Ichthyological importance.

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Tazalli Gausiya

INTRODUCTION: - Fish is a nutritional source of diet for people. It is protein rich food fulfil dietary requirement of human and protect them from protein malnutritional problems. fishes use aquatic planktons as their food for growth. In Mithilanchal, especially in Darbhanga there are numerous ponds present and used as fish culture from very long time ago and utilized as food in daily diet.

Significance of plankton, especially zooplanktons are very valuable in waterbody (Ponds) for fish culture, chiefly for its commercial production. Fisheries are also a significant source of economic benefits for many people and fisherman in the local area of Darbhanga district.

Seasonal quality of waterbody (pond) and periodical quality and quantity is highly Ichthyological significant parameter for proper fish culture. In recent environmental hydrobiological and biochemical condition, investigation relation of availability of zooplanktons is very significant for healthy stock of fish and pisciculture which is very inadequate chiefly in relation to my study on local pond, Gangasagar. In my present research water quality and periodical fluctuation of zooplanktons which will be investigated, ultimately improve the quality production of fish which will necessarily benefit the fish farmers and consumers.

In my research, comparative ecological analysis of periodical quality of waterbody and zooplankton in a year will also investigates to produce scientific data which ultimately improve the qualitative and quantitative conditions required for fish culture in selected pond.

Phytoplankton and zooplankton are crucial parts of fresh water ecosystem. Planktons are tiny aquatic animals that flow with ocean currents and the wind. It is found that mostly zooplankton are very small that can't swim strongly against the water current but many zooplankton can easily swim up and down in water column.

Various studies have made realization that zooplankton taxa are bioindicator to hydrological changes, climate changes and manmade activity induced water pollution.

Zooplankton are microscopic animals not easily visible to the naked eye. Generally trained taxonomists required dissecting and compound microscope to identity zooplankton in sample. Zooplankton shows significant seasonal shift in number and types in there aquatic habitat used by fishes as food.

Tazalli Gausiya

The zooplankton occurrence and distribution impacts fish production. So, they are the initial food for most of the larvae as well as for numerous plankton consumed fishes. So, it is important for the system of aquatic food chain, and ecological system.

In my present investigation, analysis of water and zooplankton has to be carried out in Gangasagar pond Allalpatti, Darbhanga. This water body is highly important for commercial fish culture in Darbhanga.

Zooplankton are bioindicators any harmful chemical compound found in water system, growth of zooplankton and fish are also affected which ultimately leads serious negative effect on fish production and consuming human being.

A brief review of Literature: - Many researchers published data on fresh water ecology. Researchers study the physico-chemical condition and phytoplankton population of water. The some important are simp-son (1949) worked on measurement of diversity. Rowson (1956) worked on algae indicator of tropical lake type. Philipose (1960) work on fresh water phytoplankton of island fisheries. Howker (1963) work on the ecology of waste water treatment. Richard (1966) worked on environmental hazard of water pollution. Palmer (1969) work on algae tolerating organic compound.In 1973, Bennett and David worked on the nitrogen cycle sediment water system. Robert, Ever and Robert (1974) worked on phytoplankton distribution and water quality of colorodo river. Precotte (1975) worked on algae of western great lakes. Golteman (1975) worked on river ecology. Vashisht and Sharma (1975) worked on ecology of a typical urban pond of Ambla city Haryana state. Rao (1978) worked on ecological study of three fresh water ponds of Hyderabad. Khan and Siddiqui (1977) worked on seasonal changes in limnology of perennial fresh pond of Aligarh. Das and Upadhyay (1979) studies on qualitative and quantitative fluctuations of plankton in two lakes Nainitaal and Bhimtaal. Shankaran (1982) worked on immunological studies on Sampa Reservior of Betul. Trevedi and Goel (1986) worked on chemical and biological method for water pollution. Singh (1990) studies the high altitudes limnology and its scope in India. Tiwari (1992) worked on the pollution of Hussain Sager lake of Hyderabad. Sabata and Nayer (1995) worked on River pollution in India. Verma and Mohanty (1995) worked on physico-chemical parameters of Darimukundpur pond. Anand (1998) worked on Indian fresh water algae. Govindsamay, Kannan and Azariah (2000) studied the physico-chemical properties and primary production of coastal water biotopes of coromandel coast of India. Sadguru Prakash (2001) worked on

Tazalli Gausiya

plankton of fresh water body of Balrampur. Chitra and Meera (2004) studied the flora of temporary water bodies along the semi coastal line Chackai toshan 1 gumugharn in Tiruvananthapuram. Harsha and Mallammanavar (2004) worked on phytoplankton density in Gopalswamy pond of Karnataka. Chattopadhayay and Banerjee (2007) studied the diversity of net phytoplankton in lake Krishnasagar. Agarwal and Rajwar (2010) worked on Tehri Dam Reservior of Himalaya.

Objectives: -

- ⇨ To study the seasonal diversity of zooplankton, in my selected pond for research.
- ⇨ To study the impact of different physico-chemical nature of water on zooplankton, and its seasonal diversity as well as fluctuation in their population.
- ⇨ To study the availability of different types of zooplankton and their impact on fish growth.
- ⇨ To investigate the periodical fluctuations in the physico-chemical nature of water body and diversity of zooplanktons in relation to analysis of data to produce meaningful observation on selected pond Gangasagar.

Methodology: - From the surface water of the pond zooplankton sample is collected. The net plankton which is used for zooplankton separation is made up of bolting nylon silk (mesh size 50 µm). After separation using net sample will be transferred in air tight plastic bottles and kept carefully then immediately preserved and labelled using for 4% formalin. In laboratory collected sample will be analysed qualitatively through microscope for identification of different size of zooplankton. "Drop count method" used for zooplankton analysis.

Biochemical analysis of water: -

1. **Materials and Methods**

- ⇨ Selection of sampling site in selected water body Gangasagar pond, Darbhanga.
- ⇨ Water sample will be collected and analysed on monthly basis.
- ⇨ Some physico-chemical parameters are to be studied.

2. **Physical parameters**

Tazalli Gausiya

From samples which is collected monthly will be observed various parameters such as Rainfall, Atmospheric temperature, water temperature, total solids, pH, are to be studied.

3. **Chemical parameters**

- ⇨ From monthly collected sample, Dissolved oxygen (DO), dissolved carbon dioxide, Alkalinity, Chlorinity, Salinity, Calcium, COD, BOD, Magnesium, Sulphates etc are to be studied.
- ⇨ Within 20 hours all the sample mentioned above is analysed as per the procedure given in APHA and Trivedi.
- ⇨ Zooplankton monthly collected and will preserve for study of their population density and biodiversity.

Expected result: - Various types of zooplanktons are common like rotifers, Cladocera and copepods. water living organism including zooplankton will be affected by physio-chemical changes of water. Due to having short generation time of zooplankton which suffers easily by hydrobiological changes. Expected result focused on:

- ⇨ How physico-chemical nature of water affect diversity of zooplanktons will have to be analysed on periodical basis.
- ⇨ Analysis of collected data and its Ichthyological impact is also a vital part of my present research to sort out the possible reasons for seasonal fluctuation of zooplankton.

In my investigation it had to be observed about ecological nature of selected waterbodies, availability of plankton in different periods which ultimately helps to analyse the required ecological conditions for proper production of fish.

Conclusion: - Above mention facts and information are basic parameter of my investigatory work. On these Account I want to analyse the possible factors which ultimately leads negative effect on diversity of zooplankton and finally fish production occurring in pond.

References: - some of the work carried out in past on related problems are-

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Tazalli Gausiya

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Tazalli Gamsiya

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Tazalli Gausiya